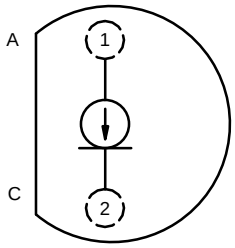
Current Regulator Diodes

J500 J503 J506 J509
J501 J504 J507 J510
J502 J505 J508 J511

PRODUCT SUMMARY

Part Number	Typ I_F (mA)	P_{OV} (V)	Part Number	Typ I_F (mA)	P_{OV} (V)
J500	0.24	50	J506	1.40	50
J501	0.33	50	J507	1.80	50
J502	0.43	50	J508	2.40	50
J503	0.56	50	J509	3.00	50
J504	0.75	50	J510	3.60	50
J505	1.00	50	J511	4.70	50

TO-226AA
(TO-92)
Modified



Top View

FEATURES

- Two-Lead PlasticPackage
- Guaranteed ±20% Tolerance
- Operation from 1 V (J500–J503) to 50 V
- Excellent Temperature Stability

BENEFITS

- Simple Series Circuitry, No Separate Voltage Source
- Tight Guaranteed Circuit Performance
- Excellent Performance in Low-Voltage/Battery Circuits and High-Voltage Spike Protection
- High Circuit Stability vs. Temperature

APPLICATIONS

- Constant-Current Supply
- Current-Limiting
- Timing Circuits

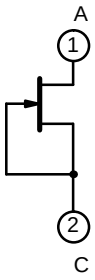
DESCRIPTION

The J500 series is a family of ±20% range current regulators designed for demanding applications in test equipment and instrumentation. These devices utilize the JFET techniques to produce a single two-leaded device which is extremely simple to operate.

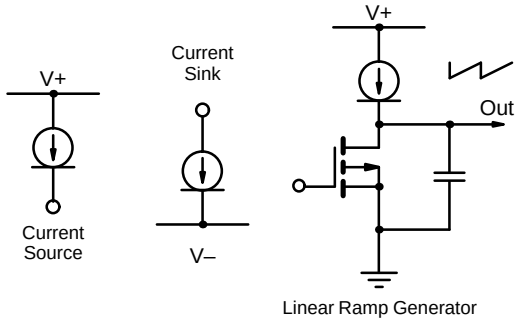
With nominal current ranges from 0.24 mA to 4.7 mA, the J500 series will meet a wide array of design requirements.

The low-cost TO-226A package ensures a cost-effective design solution.

SCHEMATIC DIAGRAM



APPLICATIONS



Linear Ramp Generator

Applications information may be obtained via FaxBack, request document #70596.

ABSOLUTE MAXIMUM RATINGS

Peak Operating Voltage . . . . . 50 V
Reverse Current . . . . . 50 mA
Storage Temperature . . . . . –55 to 150°C
Power Dissipation[a] . . . . . 350 mW

Notes:
a. Derate 2.8 mW/°C above 25°C

SPECIFICATIONS[a]

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ NO TAG	Limits Max	Unit
Peak Operating Voltage	P_{OV}	I_F = 1.1 $I_{F(max)}$ NO TAG	50	95		V
Reverse Voltage	V_R	I_R = 1 mA		0.8		
Capacitance	C_F	V_F = 25 V, f = 1 MHz		2.2		pF

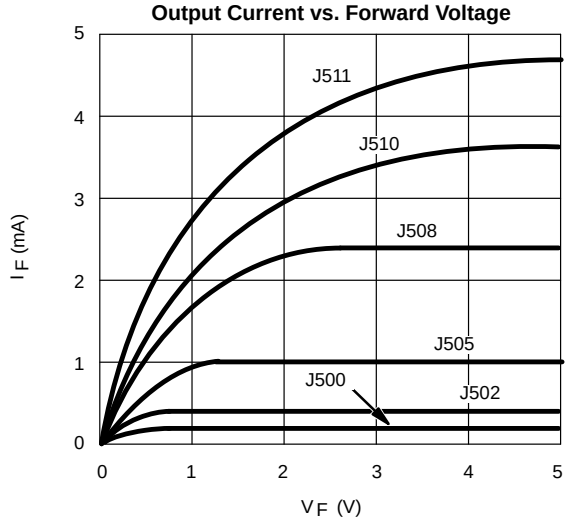
	Regulator Current[d] (I_F)			Dynamic Impedance[e] (Z_d)		Knee Impedance (Z_k)	Limiting Voltage[f] (V_L)		Temperature Coefficient (θ_1)
	V_F = 25 V			V_F = 25 V		V_F = 6 V	I_F = 0.8 $I_{F(min)}$		V_F = 25 V 0°C ≤ T_A ≤ 100°C
	mA			MΩ		MΩ	V		%/°C
Part Number	Min	Nom	Max	Min	Typ[b]	Typ[b]	Max	Typ[b]	Typ[b]
J500	0.192	0.24	0.288	4.00	15	2.50	1.2	0.4	0.95%
J501	0.264	0.33	0.396	2.20	10	1.60	1.3	0.5	0.81%
J502	0.344	0.43	0.516	1.50	7	1.10	1.5	0.6	0.70%
J503	0.448	0.56	0.672	1.20	5	0.80	1.7	0.7	0.58%
J504	0.600	0.75	0.900	0.80	3.5	0.55	1.9	0.8	0.46%
J505	0.800	1.00	1.200	0.50	2	0.40	2.1	0.9	0.33%
J506	1.120	1.40	1.680	0.33	1.5	0.25	2.5	1.1	0.19%
J507	1.440	1.80	2.160	0.20	1	0.19	2.8	1.3	0.08%
J508	1.900	2.40	2.900	0.20	0.7	0.13	3.1	1.5	–0.05%
J509	2.400	3.00	3.600	0.15	0.5	0.09	3.5	1.7	–0.14%
J510	2.900	3.60	4.300	0.15	0.4	0.07	3.9	1.9	–0.22%
J511	3.800	4.70	5.600	0.12	0.3	0.05	4.2	2.1	–0.34%

NCL

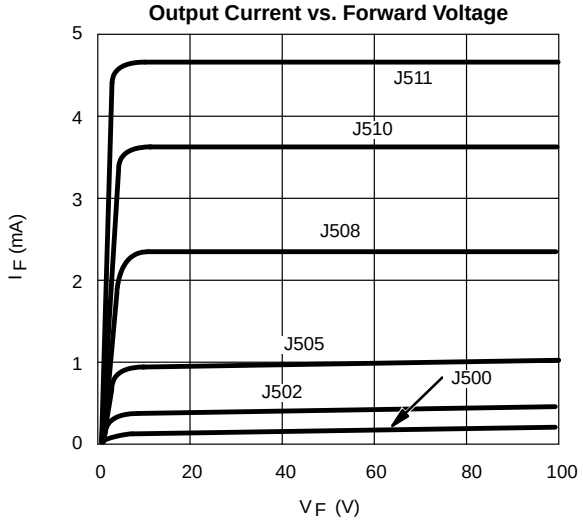
Notes:
a. T_A = 25°C unless otherwise noted.
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. Max V_F where I_F = 1.1 $I_{F(max)}$ is guaranteed.
d. Pulse test—steady state currents may vary.
e. Pulse test—steady state impedances may vary.
f. Min V_F required to insure I_F = 0.8 $I_{F(min)}$.

TYPICAL CHARACTERISTICS

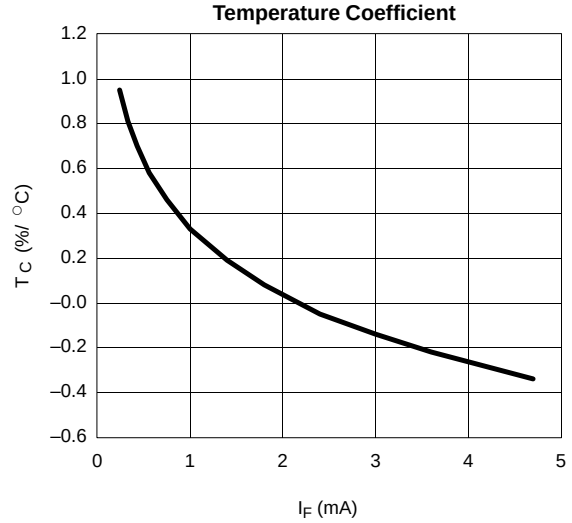
Output Current vs. Forward Voltage



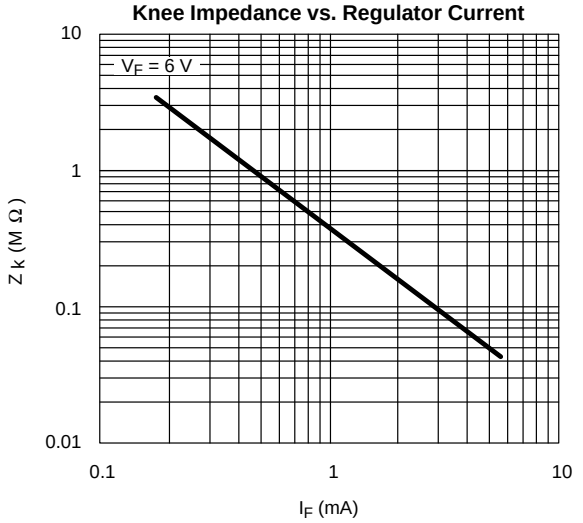
Output Current vs. Forward Voltage



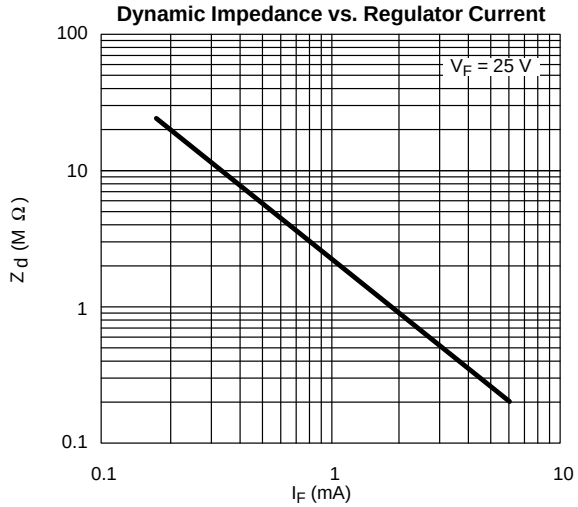
Temperature Coefficient



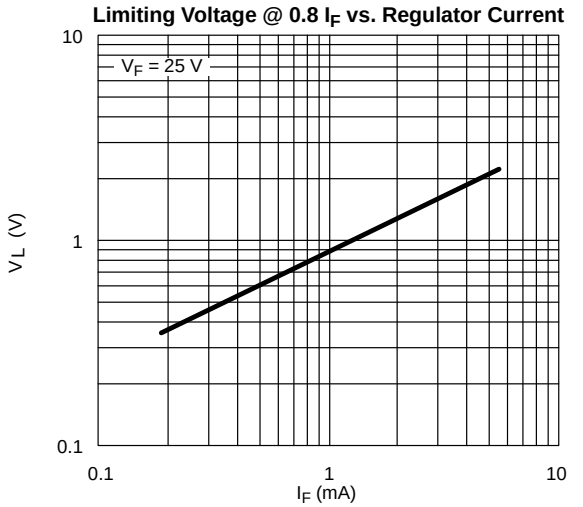
Knee Impedance vs. Regulator Current



Dynamic Impedance vs. Regulator Current

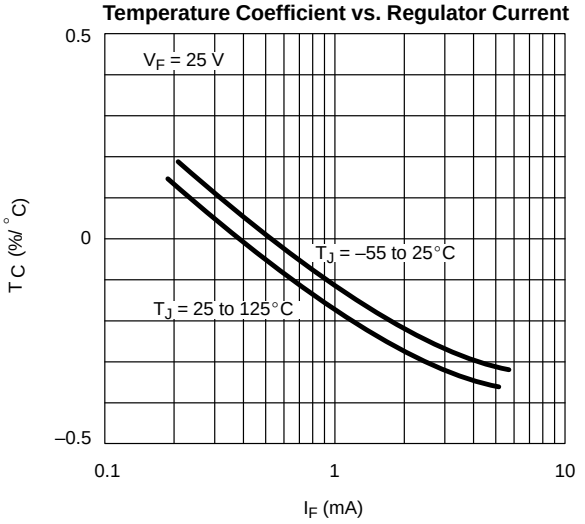


Limiting Voltage @ 0.8 I_F vs. Regulator Current

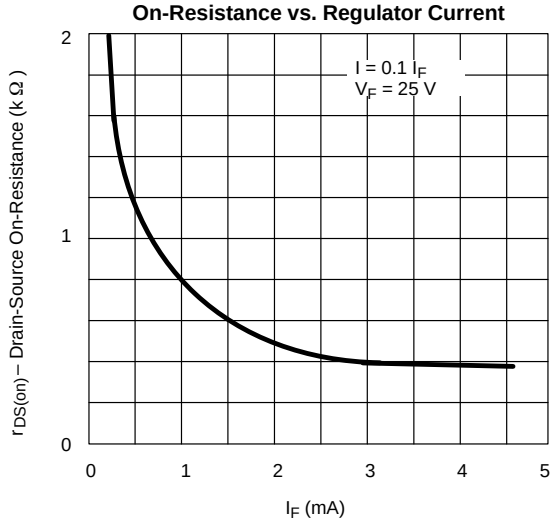


TYPICAL CHARACTERISTICS

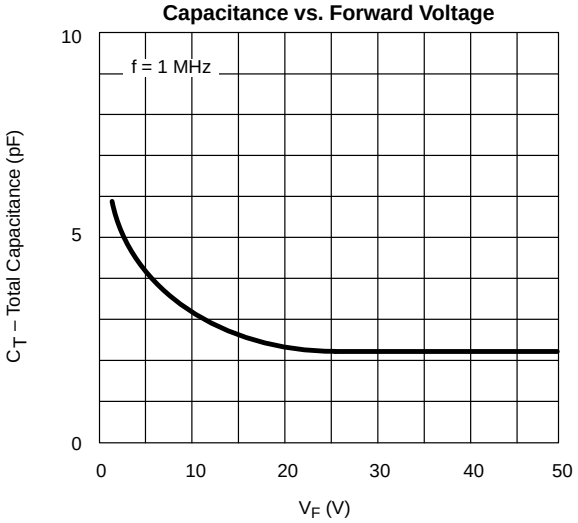
Temperature Coefficient vs. Regulator Current



On-Resistance vs. Regulator Current



Capacitance vs. Forward Voltage



CURRENT REGULATOR DIODE V-1 CHARACTERISTIC